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ABSTRACT

The Environmental Education program of Great Falls Public Schools, which was Montana's state winner in the National Science Teacher Association 1986 Search for Excellence in Science Education, is described in this report. An overview is presented of the district's policies, administrative procedures, staff development plans, and curriculum and instructional activity offerings. The environmental classes and field experiences developed for grades K-12 are explained and summarized. Descriptions are given for units on: (1) animal differences (grade one); (2) fossils (grade two); (3) solid-waste recycling, microscope use, and pond studies (grade three); (4) water, waste water, and rocks (grade four); (5) evergreens, water pollution, noxious weeds, and soil conservation (grade five); (6) a conservation trip and energy alternatives (grade six); (7) ornithology (grade seven); (8) geology (grade nine); and (9) ecology and geology (grades 11-12). Also included in this report is a compilation of letters (14) which testify to the accomplishments and merits of the Great Falls Environmental Education Program. (ML)

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Great Falls Public Schools
Great Falls, Montana

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ENVIRONMENTAL EDUCATION

Janet Thomson

1986

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K - 12

SE 046 867

Great Falls Environmental Sciences

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Ed Argenbright
Superintendent

May 29, 1986

Ms. Jan Thomson
Curriculum Coordinator
Great Falls Public Schools
P.O. Box 2428
Great Falls, Montana 59403

Dear Jan:

The state competition for the 1986 Search for Excellence in Science Education (SESE) in the area of environmental education has been completed by the selection committee.

On behalf of the Office of Public Instruction and the National Science Teachers Association (NSTA), it is a pleasure to congratulate your district on having received the honor of being Montana's state winner and our nomination to the national search.

This is an outstanding honor merited by the excellence of your work. Your district has contributed much to our young people of Montana today by training them in an essential field and I commend you on the recognition you have received.

Best of luck at the national competition.

Sincerely,

Bob Briggs

BOB BRIGGS,
Science/Environmental Education Specialist
Basic Instructional Services

gmh34

EXCELLENCE IN SCIENCE EDUCATION

THE NATIONAL SCIENCE TEACHERS ASSOCIATION

PROUDLY RECOGNIZES Great Falls Public Schools

REPRESENTING EXCELLENCE IN THE AREA OF Environmental Education

FOR THE STATE OF Montana

Chair, National Steering Committee

Chair, State Selection Committee

President
National Science Teachers Association

Executive Director
National Science Teachers Association

gfps GREAT FALLS PUBLIC SCHOOLS
1100 4th Street South
P.O. Box 2428
Great Falls, Montana 59403

May 30, 1986

Dr. John J. Padalino
Pocino Environmental Education Center
Keystone Junior College
Box 268
Dingman's Ferry, Pennsylvania 18328

Dear Dr. Padalino:

Enclosed is Montana's entry in the National Science Teacher Association's excellence competition in the area of environmental education.

If you have any questions, please contact our environmental curriculum coordinator, Jan Thomson. She can be reached by calling (406)791-2377 or by mail at the address above.

Respectfully,

Jerry D. Weast, Ed.D.
Superintendent

enclosure

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Great Falls and Great Falls Public Schools

Great Falls Public Schools serves over 12,000 students K-12. It is situated in Great Falls, Montana, a town of about 70,600. This is the middle of Big Sky Country; Great Falls is situated on the high plains with Glacier National Park to the North and Yellowstone National Park to the South. The city was "planned" by its founder, Paris Gibson, one-hundred years ago. There are many recreational activities and opportunities for campers, skiers, hikers and sportsmen. Great Falls has clean air, low humidity and an average snow fall of 58 inches, with "chinook" winds which often make winter days warm. The economic base is agriculture; Malmstrom Air Force Base also employs many people. Lewis and Clark discovered the Great Falls of the Missouri (for which the town is named) near here in 1805. The stories of the portage around the Great Falls and the discovery of Giant Springs are part of the local history.

Policy Board

Great Falls School District Number 1 and A is governed by a seven-member Board of Trustees. The Board develops policies for the operation of the school system; members are elected for three-year terms. Local, county, state, and federal taxes contribute to the Great Falls Public Schools budget of nearly $43 million dollars. Voters have

consistently approved multi-million-dollar local mill levies above state and federal support. They are strong supporters of education. There are sixteen elementary, two junior high and two senior high schools, a special education center, an adult education/alternative programs center and a vocational/technical center. (This is down from 21 elementaries in 1978 and 4 junior highs in 1984.) The district itself is the second largest employer in the city, with 1,589 employees. Forty-five percent of the 782 teachers have master's degrees; the ratio of students to staff in 1984-85 was 19 to 1 for elementary schools, 15 to 1 for junior high schools and 17 to 1 for senior high schools. The curriculum covered by Great Falls Public Schools is that of a curriculum common to kindergarten through grade twelve, plus non-traditional subjects such as environmental sciences, outdoor living, aviation science, and psychology.

Budget for the Great Falls Public Schools Environmental Education Program has been supported by the local Board of Education since 1970, when the original Title III ESEA project was completed. The local Board of Trustees develops curriculum policy for all areas; the local environmental education program is an integral part of the curriculum offerings, K-12, for Great Falls Public Schools.

The financial support includes materials in each of the twenty buildings, two full-time environmental education teachers (K-12), a bus budget totaling $30,000 in 1985-86 (K-12), inservice training for classroom teachers as needed,

and a part-time coordinator of environmental education activities.

The Environmental Education program also maintains contact with community resources and clubs concerned with the environment (see Appendix A).

ADMINISTRATION

The curriculum plan for Great Falls Public Schools requires the use of the environmental education program by all classroom teachers in grades one through six. The program also serves special education students. A variety of trips supported by curricular objectives for grades seven through twelve are strongly encouraged and supported by the administration. The environmental education program in grades K-6 is integrated into the science curriculum (see Appendix B for an example). Common experiences are utilized by each grade level; actual field experiences begin in grade three and are available through grade twelve. Two full-time environmental education instructors (John Cannon and Dennis Maxson) provide expertise to the classroom teacher and conduct field trips. A part-time coordinator, Janet Thomson, supervises the program. The $30,000 bus budget is utilized for planned and carefully sequenced field trips in grades three through twelve.

STAFF DEVELOPMENT

Teachers are continually made aware of environmental education inservice programs through on-site training. For example, each new sixth grade teacher spends two school days

on-site being trained for the conservation field trip, prior to taking his or her own sixth grade students on that field trip. Most of the environmental education inservice training program is hands-on; program instructors are continually available to help teachers prior to the field experience. Materials to support the field experiences are provided in all buildings. All teachers can phone the environmental education office to request help from the environmental education instructors. An answering device takes messages and ensures that teacher concerns and requests are quickly relayed. Environmental education staff members also answer questions about the regular activity-based elementary science program. A separate room at the center is dedicated to district central science supply and maintained by environmental education staff.

Environmental education teachers have also continued to provide inservice on demand to rural Cascade County teachers (see letter from Cascade County Superintendent, Appendix A). They have also recently shared field trip experiences with Belt Public Schools' students (twenty-five miles east of Great Falls), they present public awareness programs to agencies on demand (see Soil Conservation letter, Audubon letter, etc., Appendix A). They have also presented classes and made presentations to the State Science Association.

Staff development throughout the first years consisted of "show me" trips for classroom teachers, along with materials provided by resource specialists from many public

agencies. These agencies skill form the basis for much of the information given to students. Environmental education staff members also provide community outreach programs to various clubs and groups on demand (see Appendix A for letters). Public reminders of trips are advertised through the "Peek at the Week" bulletins provided by the District's information consultant to all media on a weekly basis.

CURRICULUM

New environmental education curriculum and field trips are constantly being developed. The environmental education teachers constantly seek advice from classroom teachers and continually revise materials and trips based upon classroom teacher recommendations. During science curriculum regeneration (approximately every five years), environmental education teachers and classroom teachers are involved in revising the total science curriculum and, consequently, parts of the environmental education program.

Great Falls' program is also integrated into many other subjects; for example, health and social studies learner outcomes have been integrated with environmental outcomes for better unit utilization.

While critical thinking is encouraged, the activities and issues for each unit are carefully considered so that the developmental maturity of the learner is considered. Elementary school students are provided with direct, concrete experiences appropriate to their learning level.

The units utilized in the environmental education program involve students in community problems. Fifth graders are involved in issues about water quality and fish, while all grade levels are involved in a program on prevention of vandalism in the outdoor environment. Sixth graders become involved in the issues of cleaning up coal mining sites and the third graders learn about the recycling of resources for waste conservation. High school students learn about the issues involved with wise land use. An effort is made to provide a balanced viewpoint of controversial issues wherever possible. Human values are respected and instructors work judiciously to avoid biases in their presentations. Students learn to use two process skills (science and social studies concepts) in developing their abilities to think.

Sites throughout the Great Falls region are utilized for environmental education field experiences, rather than one designated area. For example, sixth graders in the Forest-Prairie experience travel over seventy miles to several sites, including a deciduous plant area near Belt, a mine-polluted stream near Belt, a quality fish-producing stream (Belt Creek), a small watershed (Memorial Falls), a small valley used for orienteering (Dry Fork of Belt Creek), and a transition forest area in the Little Belt Mountains. Holter Lake and lands southwest of Great Falls, near Cascade and Hardy Creek, are sites for the fifth grade Soils Unit.

High school students in grades ten through twelve enrolled in Montana Ecology/Geology utilize a variety of sites throughout central Montana, as well as Yellowstone National Park (three-day field trip). Other examples are provided in the section titled "Program Description".

INSTRUCTIONAL ACTIVITIES

The Great Falls environmental education program was implemented with ESEA Title III funding in 1967 as a direct result of a Title III planning project by Margaret Adams in 1966. The original major objectives of the program are continued in today's program:

1. Utilize the outdoors as the classroom to teach broad ecological concepts through first-hand experiences.
2. Curriculum planning in the form of curriculum outlines and prepared units of study correlated to outdoor study.
3. Inservice training for teachers.
4. Provision for necessary equipment and supplies to function as an integral part of classroom curriculum.
5. Professional leadership and teacher assistance in all activities by two program teachers, coordination of the total environmental education program with all departments of schools.

These major objectives are supplemented by revised unit goals and objectives for each planned experience. Materials for all experiences are built around the goals.

AGENCY/PROFESSIONAL ORGANIZATION RELATIONSHIP

The local program utilizes materials available through agencies. The department maintains a working relationship with the U. S. Forest Service, Cascade County Conservation

District, Benton Lake National Wildlife Refuge, Yellowstone National Park, Montana Fish and Game, Montana Office of Public Instruction (Project Wild, Project Learning Tree), Upper Missouri River Breaks Audubon Society, U. S. Bureau of Land Management, Montana Water Quality Bureau, Cascade County Mosquito Abatement District, the Great Falls Police Department, Montana Academy of Sciences, Montana Science Teacher Association, Montana Energy Education Council, and other organizations.

Materials from many of these agencies are utilized (see, for example, the letter from Cascade County Conservation District, Appendix A).

The learner outcomes for environmental education are expressed in each environmental education unit. They are also expressed within the science curriculums K-9 (grades 10-12 are under revision at this time). Within each science curriculum, environmental objectives are integrated with regular science learnings.

Curriculum regeneration is by teachers. Approximately every five years, the science curriculum and some of the environmental education experiences are regenerated by committee. For example, in 1981-82 some curriculum and materials were revised along with some of the field experiences; the two environmental education teachers also participated in the revision. Environmental education materials are revised as needed each year; materials and

guidelines for each unit are distributed to the teachers. Teacher guides are provided for many of the experiences so that teachers teach unit concepts within the classroom prior to the field experience.

PROGRAM DESCRIPTION

The following pages describe the environmental classes and field experiences, K-12, in the Great Falls Public Schools.

GRADE ONE - Animal Differences

The Animal Differences Unit, presented at grade one during third quarter, combines learnings from science, social studies and health and meets the general learner outcome, "recognizes similarities and differences among animals and the way in which they meet their needs." About 1000 students annually take part in the slide show and show-and-tell animal differences classroom lesson. Prior to the classroom lesson (which is directed by environmental education teachers) classroom teachers utilize chapter three in the Heath Science Book on animals to support and preteach some of the concepts. Lesson goals include:

1. The student knows that animals use their different parts to help them live.
2. The student knows the difference between horns and antlers.
3. The student knows that talons are for holding and killing food.
4. The student knows that hooves protect the bottoms of heavy animals' feet.
5. The student knows that scratching type feet (chicken) are used to find food.

6. The student understands how ducks use the webbing on their feet for swimming.
7. The student knows how different feathers serve birds in a variety of ways.
8. The student understands the purpose of guard hair on some animals.
9. The student knows that all animal hair is not the same.
10. The student knows how animals can use their hair to protect themselves.

These lesson goals have been pre- and post-tested as a means to evaluate the curriculum. In 1982, the test was teacher-administered and students responded by marking smiley or yuckey faces (see Appendix A for results). The next testing will be done in 1987.

Classroom teachers also teach an environmental unit during the fourth quarter of the year (organization plan for regular curriculum, Appendix A). Although the environmental education department is not directly involved with this unit, it supports the classroom teacher with the district science kit which is stocked each year from environmental education supplies and materials on request. Teachers also utilize science, health and social studies texts as a means for students to read about the environment. In science, for instance, students read chapters on air, water, plants, rocks, and soil; while in social studies, they read about the earth. Additional supports provided to the teacher are requested materials from the environmental science center, review materials (see Appendix B for an example of A-V materials listed). While the animal unit was not included

in the original grant of 1967, it is an extremely popular unit with teachers and students.

GRADE TWO - Fossils

The grade two Fossils Unit, although not in the original environmental project of 1967, was added in response to teacher requests in the early 1970's. The fossil classroom lesson is an integral part of the science/social studies/health combined class. Two general learner outcomes in the combined learner outcomes are: "Is aware of the extinction of animals, past and present," and "Recognizes fossil evidence." In addition, the general lesson goals for the fossils experience include:

1. The student knows of what a fossil is made.
2. The student knows that fossils are very old.
3. The student knows how fossils are formed.
4. The student knows what extinct means.
5. The student understands that all fossils are not of extinct plants and animals.
6. The student understands that both plants and animals can become fossils.

Prior to the classroom lesson by environmental education teachers, the classroom teacher might utilize chapter eleven of Heath Science (Plants and Animals of Long Ago) as an introduction to the topics of fossils. Children love to discuss dinosaurs, so this topic is a popular one. In addition, the teacher has available a large library collection on fossils and dinosaurs, a large audio-visual collection (see lists in Appendix B) and district science kit materials prepared by the environmental education teachers.

The environmental education personnel come on a scheduled basis to each second grade classroom (see schedules in Appendix B). The actual experience consists of a show-and-tell fossil collection. Students are allowed to handle all of the fossils during the discussion generated by the children. Each child also is given a shark's tooth as a lasting reminder of the fossils lesson. Teachers might follow up with more materials from the chapters on patterns of plants and animals from Heath Science. Other chapters studied by these students include plants and animals on land and plants and animals in the water. About 1000 students per year are included in the show-and-tell fossil talk. Teachers have support materials to help them with the pre-teaching and post-teaching segments. This area was also tested in 1982 and will be again tested in 1987.

GRADE THREE

Solid Waste-Recycling Unit

The solid waste recycling field trip was added to the environmental education curriculum in the 1970's as a means of helping students understand the resources which are renewable and those which are non-renewable. Students also begin to understand the choices made today influence the way in which people live in the future. Other goals for the unit include:

1. The student knows the sources and uses of coal, natural gas, oil, water, etc.
2. The student is aware of the cause and effect of depleted natural resources.

3. The student is aware of the need for people to adapt to new conditions caused by new technology.
4. The student is aware that pollution control is an individual's responsibility.
5. The student understands that providing for people's needs/wants depletes natural resources.
6. The student is aware of problems which result from overuse of and lack of conservation of resources.
7. The student begins to understand the benefits of conservation.

Approximately 1000 third grade students participate in a two-week solid waste-recycling unit started in the classroom by the classroom teacher. The teacher utilizes booklets and teacher materials provided by the environmental education department in addition to the "blue" kits found in each building library and the materials prepared by the building librarian.

Environmental education teachers provide a culmination experience by taking students on a two-hour tour of a local recycling center (Pacific Hide and Fur), the Coca-Cola Bottling Plant, Weismans Recycling, and the County Sanitary Land Fill. This trip was last tested in 1982 as a means to revise the curriculum; it will be tested again in 1987 (see Appendix A for test results).

Microscopes

The microscope technique lesson was planned in the original Title III grant of 1967. This experience is still successful with third graders today. Rather than being a culminating experience, it is a beginning activity for all third graders, who learn to use a microscope correctly. Staff members bring microscopes for the one-hour session,

although each building has microscope sets which are used by the third graders after the initial lesson. They learn microscope techniques by looking at hair, prepared slides, etc. This area has also been evaluated as a means to revise the curriculum and materials. The last district-wide test was in 1982; this is planned again for 1987 as part of the district review process. Of course, environmental education staff members utilize tests (informal and formal) to test what students have learned in most situations every day. The goals for the microscope unit are:

1. The student will understand the importance of performing tasks in a given order.
2. The student recognizes the need of knowing the parts of a microscope in relation to following directions.
3. The student understands the need to develop fine motor skills and practice them in order to increase proficiency in using a microscope.
4. The student continues to increase personal knowledge of microscopic animals and the microscope.
5. Each student will sharpen his/her skills at following multiple directions.
6. The student becomes aware of the "micro" world.
7. The student develops more cooperative attitude in working with a partner.

Pond Study

The pond study was added in the 1970's to take advantage of the microscope lesson and the proximity of Benton Lake National Wildlife Refuge to Great Falls. The goals include:

1. The student understands the concept of a community and its dependence on food chains.
2. The student can explain the effects of pollution upon a food chain.

3. The student understands the habits, migration, and adaptation of organisms.
4. The student understands the concept of a population and how it grows, interacts, and changes within its habitat.

Benton Lake National Wildlife Refuge is located ten miles north and west of Great Falls. Students gather in a shelter-belt on the refuge to collect grasses and other materials for a "collection". They learn to step carefully in fowl production habitat. They travel to the shores of Benton Lake to identify fowl and to collect their own sample of pond water for classroom study with a microscope.

GRADE FOUR

Water/Waste Water Experience

The water/waste water experience became a grade four trip in 1981-82 when the experience was re-evaluated in the light of the new science curriculum. This particular unit was originally planned in 1967 and is still part of the curriculum today (updated). Goals for the students are:

1. The student knows how different kinds of machines make work easier.
2. The student understands the process of water purification.
3. The student understands the process of managing waste water.
4. The student understands the importance of water conservation.
5. The student recognizes the need for proper resource management.
6. The student recognizes resources which are renewable and those which are non-renewable.

Resources utilized by the teacher for a two-week pre-teaching unit include a teacher's manual, student booklet, the "blue" kit in the library, audio-visual films,

and other materials collected by the building librarian. (Some of these materials were originally provided by the grant in 1967.) Students visit the water treatment plant on the Missouri River; environmental education teachers give a one-hour talk about water treatment and students tour the plant. Back in the classroom, environmental education teachers show slides about sewage treatment and Enviro-Tech's operation in Great Falls. This area was also tested in 1982 and will be tested again in 1987.

Rock Unit

The fourth grade Rock Unit is important because it is the first exposure students have to a simplified scientific key. This show-and-tell experience for all fourth graders allows students to utilize a simplified scientific key to identify several different kinds of rocks. Students keep the keys and most teachers continue to utilize the key in other lessons (integrates with science chapter eight on rocks in Heath Science). Goals for this unit include:

1. The student knows the formation of three main kinds of rock.
2. The student understands the formation of minerals, crystals, and fossils.
3. The student knows the rock cycle.
4. The student understands the formation of a volcano.
5. The student is made aware of the keying process used in identification.

Over 900 students participate in this class annually.

GRADE FIVE

Evergreen Unit

This unit was added as an experience in the 1970's, based upon request. The goals for this classroom experience for all fifth graders include:

1. The student knows that characteristics make one thing different from another.
2. The student knows the characteristics most commonly associated with evergreens.
3. The student knows how to use a key to identify evergreen trees common to Montana.
4. Each student is able to identify five or six Montana evergreens.

The evergreen experience, held the week prior to Christmas vacation, provides students with a chance to utilize a more sophisticated scientific key to identify evergreens. It also provides them with a slide show on evergreens and the proper technique of cutting Christmas trees. Students are given a Christmas tree tag and told how to properly cut a tree and use the tag (many parents request extra copies of the evergreen key given to students).

Water Pollution

The grade five Water Pollution field trip was revised in 1981-82 in response to the revision of the district science curriculum (in the original 1967 grant, this was a sixth grade experience). Goals include:

1. The student knows that water is one of the most valued resources.
2. The student will understand the type of fish he may catch will tell him about the quality of the water.
3. The student will understand that water pollution has been a problem for centuries.

4. The student knows that a quality environment is needed by fish.
5. The student understands that the habitat needs of fish are not all the same.
6. The student will understand that seasons, sizes, and limit regulations help control excessive demands on fisheries.
7. The student will understand that fish hatcheries play a limited part in fisheries management.

Students study water pollution and its effects on fish population in the classroom prior to the time that environmental education teachers take them on a trip to Giant Springs, three miles from Great Falls. Giant Springs is also the site of a fish and wildlife hatchery production site. Students test the water and note what kind of habitat is needed in order to raise fish.

Noxious Weeds

Noxious weeds are also studied briefly in the classroom. Environmental education teachers provide a brief introduction to kinds of noxious weeds and the attempts man has made to get rid of these. This is a new unit and will probably become part of the fifth grade soils unit next year.

Soil Conservation Unit

The fifth grade soil conservation unit was a part of the original 1967 grant. Goals for the unit include:

1. The student understands that soil is formed by the weather process and knows that soil is composed of air, water, minerals and organic materials.
2. The student realizes that there are many different types of soil.
3. The student understands that soils are identified by their characteristics--structure, color and chemical makeup.

4. The student knows that plants obtain nutrients from the soils for their own growth and that animals depend upon plants for food and protection.
5. The student knows that man depends on plants for many reasons.
6. The student realizes that farming can sometimes destroy acres of valuable land and that some forestry techniques can damage the soil.
7. The student realizes that cities and transportation networks can also destroy prime soil resources.
8. The student understands wise use and long-range planning will ensure that future generations have adequate soil resources.

Students go a substantial distance from Great Falls during the course of this trip. Sites include road cuts at Cascade, Montana (25 miles from Great Falls), Holter Lake, where students learn to utilize contour maps and compasses, and the Hardy Creek area (site of an extinct mud volcano); students also stop to look at saline seep. They learn to do chemical tests and temperature tests to determine what can be grown in different types of soil (see booklets under separate cover). This trip was also tested in 1982 and will be again.

GRADE SIX

Conservation

Sixth graders begin the year with a two-day conservation field trip; these day-long field experiences provide students with lessons in prairie and forest ecology, water chemistry, ecosystems, orienteering and classification. Nearly nine-hundred students walk the length of a small watershed (Memorial Falls), observe succession, utilize two keys to identify deciduous plants and evergreens, test polluted water to determine the causes

of pollution, determine the amount of water necessary to supply Great Falls daily, determine the suitability of Belt Creek as a fishery, use contour maps and compasses to orienteer four different courses in a mountain drainage, and learn techniques of dendrochronology. Emphasis is on decision-making and the ability to make observations and chart information.

Goals include:

1. The student understands that all animals do not occupy the same community.
2. The student knows how to use plant and evergreen identification keys and knows the importance of classification in science.
3. The student understands that characteristics make individual plant and animal types different from each other.
4. The student understands the role of adaptation in seed dispersal.
5. The student understands that succession is an ongoing process.
6. The student knows ways of determining age of plants and animals.
7. The student understands factors that determine kind of climate, knows that climates have changed in the past and continue to change, and knows how climate affects people.
8. The student can explain changes which take place in an ecosystem as living things interact with each other and with non-living matter.
9. The student understands stages of growth and development of living organisms.
10. The student understands the effect of industry on the environment.
11. The student knows that pollution control is the individual's responsibility.
12. The student begins to understand natural resources, conservation, and pollution problems.
13. The student utilizes the compass and contour maps to identify landforms when orienteering.

Classroom teachers have several science chapters and activities available to preteach concepts prior to the actual field experience. Classroom teachers aid the

environmental teachers throughout the course of the trip, so they must also be knowledgeable about the experience.

ENERGY ALTERNATIVES

During the spring of the sixth grade year, students first study Energy and Energy Alternatives (teacher guides, student booklets and kits, and audio-visual materials are available in each school), prior to a half-day energy alternatives field trip with environmental teachers. Some of the goals are:

1. Knows that energy we use can be divided into renewable and non-renewable sources, and knows energy sources.
2. Recognizes the need for energy conservation and becomes aware of weatherization products.
3. Understands that choices made today influence the way people will live in the future.
4. Recognizes the need for government and public cooperation to solve problems.
5. Knows the sources of, and uses of coal, natural gas, oil, water, etc.
6. Is aware of the need to adapt to new conditions caused by new technology.
7. Develops a repertoire of habits to help parents save money on energy in the home.
8. Understands the uneven distribution of energy sources in the world.
9. Explains and evaluates ways in which world natural resources have been utilized, allocated, and conserved.
10. Identifies alternative energy sources that could be used in place of fossil fuels.

Ornithology

Seventh graders study ornithology as a unit in life science before spending a half-day at Benton Lake Wildlife Refuge identifying birds with the aid of a bird key. Environmental education teachers teach conservation

practices, the role of public agencies in conservation and the rationale for reserving land to certain uses.

Geology

Ninth grade earth science students have a variety of experiences in geology and environmental practices available. Trips are planned in conjunction with the particular unit being emphasized by the teacher (see Appendix B for the "Environment" strand taught in ninth grade--this strand is new for fall, 1986).

Ecology

Separate ecology and geology classes for grades 10-12 are taught by other teachers each year. The environmental education department provides materials, planned trips and expertise to teachers on demand. Highlights of a trip to Yellowstone Park in spring, 1985, are included in Appendix B.

The teacher, Jim Abbas (a former environmental education teacher), plans to repeat this trip in the early fall, 1986.

OTHER ACTIVITIES

Department teachers also provide classroom demonstrations on demand whenever weather forces the cancellation of field trips (fish dissection, for example). The classroom teacher goes along on all field trips and helps instructors as necessary. The environmental education center is maintained at Paris Gibson and includes materials which can be requisitioned by the teacher. Each separate

building also has full library facilities with materials devoted to environmental education materials. On occasion, the answering device at the center, which is used to take messages from teachers, is turned into an information giving device. Recently, it was used to give information to fourth graders about the night sky (32 classrooms of students) learning about space as another environment.

HISTORY

When the project was originally written by Curriculum Coordinator, Margaret Adams, in 1967, all schools in Cascade County were invited to join in the ESEA Title III grant. The original goals still form the basis for today's program. Twenty county schools participated during the lifetime of the grant with, for example, 9185 students participating in ten grade levels in 1969-70.

As originally conceived, emphasis was placed on the three-day conservation camp held first at Neihart and later at the University of Montana's Lubrecht Forest Forestry School Laboratory. When federal grant money ran out in 1970, the public school district made the decision to fund the project in its entirety except for the three-day camp. At that point, the local district required the curriculum for all elementary city schools. Appropriate day-trip alternatives were sought, field-tested, and today form the basis for a two-day field trip (one of the three days in the

original camp-out was utilized in travel to and from western Montana).

Mr. Cal Ryder was hired as the project coordinator, and provided leadership in environmental education until moving to other responsibilities in 1981. Mr. Dennis Maxson has been a department teacher since the project's inception in 1967. Mr. Jim Abbas taught in the department for thirteen years until moving to a high school science position in 1984. Mr. John Cannon (a former elementary student of Mr. Maxson's!) started environmental education programs in two rural school districts before joining Great Falls Public Schools in 1983 and the department in 1984.

INFORMATION

People and agencies familiar with the Great Falls Environmental Education program feel that it has served to raise the level of consciousness about science and environmental education for students and teachers. The district feels the program is important to the needs of children and continues to support the program.

For further information about the Great falls Program, please contact Janet Thomson, Curriculum Coordinator, (406) 791-2377, Great Falls Public Schools, Box 2428, Great Falls, Montana, 59403. Tours and materials are available upon request.

Cascade County Conservation District
1211 Bypass Northwest - Great Falls, MT 59404 - Phone (406) 727-3603

DALE MARXER, Chm
Millegan Rte, Box 39
Gt Falls, MT 59401
866-3259

RODNEY PHIBYL, Vice-Chm
Eden Rte
Gt Falls, MT 59401

EINAR HOVLAND, Treas.
RR 1282
Gt Falls, MT 59401

LOUIS MUNDT
Belt, MT 59412

DAVE SHANE
Rte. 1, Box 38
Floweree, MT 59440

ROBERT E BUTCHER
300 Central Ave.
Gt Falls, MT 59401

JOHN S. JERMAIN, Urban
4611 2nd Ave. N.
Gt Falls, MT 59401

Associates

JIM DAWSON
Box 161
Belt, MT 59412

TED NEUMAN
Vaughn, MT 59487

TERRY REARDEN
Range Leader
Millegan Rte
Gt Falls, MT 59401

JOY FULTON
Administrator

May 23, 1986

Great Falls Public Schools
Mrs. Jan Thompson, Curriculum Coordinator
PO Box 2428
Great Falls MT 59403-2428

RE: Environmental Education Department

The Great Falls Public Schools Environmental Education Department is a valuable and pertinent part of the public education of youth in this area.

The Cascade County Conservation District has supported the department's activities for a number of years. About eight years ago, the school district had to face budget cuts. One of the areas they suggested cutting was this department. Mr. Cal Ryder was then the department head. He also, was active in meeting with the Conservation District board on the various activites of the environment that we sponsor in the county. We thus, knew the purpose of the program through the local schools and the fine job they were doing. We went to the district and supported the need for this part of education to remain within the educational system. Reading, writing and arithmetic are necessary but having an appreciation for the environment we live in is a must. The school board did reconsider and the program was left in the system.

More recently, Mr. Dennis Maxson, Mr. Jim Abbas, and Mr. John Cannon were instructors of the program. Mr. Maxson and Mr. Cannon are presently the gentlemen who head up the department and who we have more recently worked with in such programs as the new Montana Agriculture in Montana Schools, (AMS).

These gentlemen provided a workshop at one of our six-county AMS meetings outlining the various parts of the Environmental Education program according to the grade levels. It was most interesting and incorporates not only environmental concerns, but agriculture and conservation; these three elements must work together.

The instructors of the department have been most cooperative with the Conservation District in programs that we also, sponsor--such as youth tours, the AMS program, and incorporate materials that we have donated to the schools. These have included a conservation "comic" booklet from the Soil Conservation Society of America. The booklets are on various environment and conservation subjects and geared mainly for the grade school levels. We have annually donated copies of the booklets for each student for various grades and

teachers' guides. Mr. Maxson and Mr. Cannon have readily accepted the materials and used them.

As a local entity with a board consisting mainly of farmers and ranchers (but with two urban supervisors as well) we sometimes have had a problem of interest from urban areas. Sometimes people have thought that the conservation district is only for rural people; it is not--it is for everyone as we all need the environment we live in. The Great Falls Environmental Education Department, however, has been understanding and cooperative. We have had excellent communication.

We sponsor a Managed Natural Area east of Great Falls. The department has used the area at times for tours. The area is unique in the various geology, plant life and soils of a small but informative 100-acres.

The instructors of the Department are exuberant in their involvement of public education, but also give of their personal time, energies and resources. Anyone associated with these people can hear and see the love they have for their work--working with youth as well as having a keen desire to incorporate appreciation for the environment needed by mankind for existence and a quality life. So many of us often take that for granted; not these people.

If we don't appreciate the creation around us and have wisdom for that all other education will be of no value.

We have more than once over the years wanted to nominate the Environmental Education Department for the conservation districts "Teacher of the Year" Environmental Education award. This award offers cash awards and free trips on a national level. But, the program does not allow recognition to teachers whose main curriculum is conservation and environmental instruction. Only those who incorporate these into the regular program. We, however, express our sincere thank you to the gentlemen involved in the Great Falls Public Environment Education Program. We hope that the school system will continue to have this program; it is a necessary part of public education.

We extend our thanks for a job well done.

Sincerely yours,

Dale E. Marxer
Chairman
Cascade County Conservation
District

jf
CC: Dr. Gerald Weast,
Superintendent

Upper Missouri Breaks
AUDUBON SOCIETY

P.O. Box 2362, Great Falls, Montana, 59403

TO: Jan Thomson, Curriculum Coordinator
Great Falls Public Schools

FROM: Margaret Adams, President
Audubon Society

DATE: May 26, 1986

The members of the Upper Missouri Breaks Audubon Society are very much aware of the excellence of the "Environmental Education" program of the Great Falls Public Schools.

Within our membership we include professional geologists, biologists, and wildlife management experts as well as many skillful and knowledgeable amateurs.

The program presented by the environmental education personnel is carefully researched and presented in an educationally sound manner so that the school pupils are presented accurate information in a stimulating manner.

We have witnessed a sustained awareness of environmental concerns among pupils, teachers and parents. Many of us know, personally, young people who have entered professional fields in the broad area of "science" because of interest which was aroused or stimulated by the Great Falls Public Schools' environmental program.

Nationally, studies have shown that science is the weakest area of instruction in most public schools. The Great Falls schools, through the "environmental education program" has provided inservice education for teachers and thereby has strengthened the science instruction in all elementary classrooms. The special classroom presentations such as "Christmas trees" for fifth graders, or "microscopes" for third graders by the environmental education teachers, as well as carefully planned and executed field trips, have enriched science for all elementary children as well as for special science classes at junior high and high school levels.

Margaret Adams

CASCADE COUNTY
CONSOLIDATED PESTICIDE PROGRAM

521 - 1st Avenue N.W.
Great Falls, Montana 59404
Phone 727-2804

BOARD MEMBERS

Walter H. Savoy, Chairman
Fort Shaw
Jody Cox, Vice Chairman
Milligan Route, Great Falls
Rev. Francis McInnis
College of Great Falls
Dale Johnson
Bell
Eugene Suek
Bootlegger Trail, Great Falls

Douglas L. Johnson
Administrator

Mrs. Jan Thomson
Great Falls Public Schools
P.O. Box 2428
Great Falls, MT 59403

Dear Mrs. Thomson:

I am writing to commend John Cannon and Dennis Maxson of the Environmental Education Department for their work in the development of a program on some of the noxious weeds of Cascade County. The spread of these exotic weeds is a threat facing every Montana landowner. An infestation of Leafy Spurge or Spotted Knapweed, for example, can seriously affect the land's value for farming, grazing, wildlife habitat or recreation. An informed public can ultimately make the job of weed control easier.

I feel that the information and hands-on experience available to the students through the Environmental Education Department of the Great Falls Public Schools is an invaluable aid to their education.

Sincerely,

Kathleen M. Knaphus

Kathleen M. Knaphus
Botanist

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BENTON LAKE NATIONAL WILDLIFE REFUGE
P. O. Box 450
Black Eagle, Montana 59414

IN REPLY REFER TO:

May 23, 1986

Mrs. Jan Thompson
School District No. 1
P. O. Box 2424
Great Falls, Montana 59403

Dear Mrs. Thompson:

I would like to commend the local district's environmental education program which has been developed over the past several years. I feel the way the program was developed through separate staffing has been very beneficial to this agency and to the quality level of the program that exists today.

Many school systems that I have dealt with over the past 20 years frequently depend for such environmental education programs on local refuge staffs for little more than guided tours.

The three main programs that your district has developed which utilize and illustrate the refuge habitats are bird studies, aquatic life studies and the shelterbelt/grassland studies.

It was quite a refreshing experience to come to this station with such a well developed program in operation and not have to have that added burden on the local refuge staff work program.

Your staff has done a good job of coordinating with the refuge programs and with current road conditions on the refuge. We appreciate the fact that under poor road conditions and bad weather, your program has the flexibility to reschedule and still provide the important nature orientation that few city school systems can provide.

Although Montana is a wide open state with a considerable amount of wildlife and wildland resources available to its people, the basic human nature tends to overlook the importance of training and understanding the interactions between man and the local environments. It is so easy for people living in towns to stay within the city limits and receive their entertainment and recreation without being aware of the great out of doors just outside of town.

There is a need for this stimulating of the student's awareness of his surroundings and man's interaction with the local environment. We are pleased to have the opportunity to provide the base for the local programs for the third and seventh grade classes and look forward to a continued environmental education program that helps the students understand and more appropriately relate to the natural resources of this state.

Sincerely yours,

Robert L. Pearson
Refuge Manager

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
LEWISTOWN DISTRICT OFFICE
Airport Road
Lewistown, Montana 59457-1300

Dear Committee Members:

The Great Falls Environmental Science Program is a great asset to the public school students, teachers, parents and to others living in Cascade County.

This program has been improving and expanding in the school system since starting in the mid 1960's.

Excellent leadership by school administrators and interested teachers resulted in hiring an enthusiastic Environmental Coordinator (Calvin Ryder) to pioneer an environmental science program that is interesting, educational, and rewarding to the participating students.

Environmental science field trips were carefully planned in the program's formative years to include the best resource specialists from federal and state agencies to assist the coordinator and teachers with developing resource concern stops, such as the Crooked Falls Managed Natural Area, and pertinent handout material.

I believe the Great Falls school administration and environmental science coordinators continue to do an excellent job in teaching environmental awareness to students and suggesting alternative solutions to resource problems. They continue to search for new information and techniques to use in environmental science education.

My 20 years of experience with this program leads me to believe it's an outstanding educational tool.

Sincerely,

Clair O. Clark

Clair O. Clark
Soil Scientist, BLM
Lewistown, MT

Montana Department of Fish, Wildlife & Parks

1420 East Sixth Avenue
Helena, MT 59620
May 29, 1986

Janet Thomson
Curriculum Coordinator
Great Falls Public Schools
Box 2428
Great Falls, MT 59403

Dear Janet:

Congratulations on the Great Falls Environmental Education Department being nominated as one of the outstanding curriculums in the state of Montana and I am confident it will be chosen as one of the top curriculums in the country.

As you well know, I have worked with your environmental education program during the past several years. I know it has been in the Great Falls public school system for nearly 20 years and that it serves approximately 11,000 school children in Great Falls every year.

The most impressive facet of the program is that it works well for every grade level and that it integrates well with the district's science, social studies and health curriculums. In fact, the environmental education curriculum fits in very well with Project WILD, a new program which is sponsored jointly by the Western Association of Fish and Wildlife Agencies and the Western Regional Environmental Education Council. I have personally taught many Project WILD programs in the Great Falls schools and have trained many of your district's teachers in Project WILD workshops and have provided them with Project WILD materials in the four years that Project WILD has been in Montana. I know that the two programs enhance each other and can only help the children of Montana learn about the ways in which their actions will determine the future of wildlife, natural resources, the environment and, ultimately, the quality of life on earth.

Keep up the good work and good luck as your pursue future goals to help our youth become aware of the fragility of our environment and the need to protect our habitat and the habitat of all things wild.

Sincerely,

Vince Yannone

Vince Yannone, Assistant Administrator
Conservation Education Division

City of GREAT FALLS Montana 59403-5021

P. O. BOX 5021 TELEPHONE 406 / 727-5881

May 28, 1986

Mrs. Jan Thomson
Great Falls Public Schools
P.O. Box 2428
Great Falls, Montana 59403

Dear Mrs. Thomson:

This letter addresses some of the areas in which the Environmental Education Department continues to be involved with the City of Great Falls operation in a cooperative and effective program.

One of those areas is the tours of the city landfill in which there are discussion of how landfills work, its need for the city residents for sanitary disposal of refuse to insure a healthful environment. In past years there have been tours of the refuse pulverizer plant with discussion on its operation and values to society.

Another area is the tours of the water treatment plant in which there are discussions of how water is obtained from the river and purified to make it safe to drink. In addition, tours of the waste water treatment plant (Envirotech) show how the city purifies and cleanses its waste water and sewage, the need for this cleaning and the environmental impacts involved.

We have enjoyed working with Mr. Dennis Maxon and Mr. John R. Cannon on this cooperative program and I offer my compliments on their professionalism and true dedication to their work. We will be looking forward to continuing this type of program in the future.

Sincerely,

Robert Duty

Robert Duty, Director
PUBLIC WORKS

United States Department of Agriculture
Forest Service
Lewis & Clark National Forest
P. O. Box 871 - Great Falls, MT 59401

Reply to: 1600

Date: May 28, 1986

Subject: Great Falls School Environmental Education Field Trip

To: Jan Thomson
P. O. Box 2428
Great Falls, MT 59402

Dear Jan:

I recently had the opportunity to participate in an Environmental Education Field Trip sponsored by Mr. John Cannon and Mr. Denis Maxson of the Environmental Education Department of the Great Falls School System. My roll was to explain the geology and geologic history of the Little Belt Mountains.

I was very impressed with the enthusiasm and professionalism of Mr. Cannon and Mr. Maxson towards the subject matter. They articulated the importance of resource conservation and development in such a way as to hold the attention and hopefully make a lasting impression on a bus-load of soon-to-be out of school High School students. Lively discussion was generated all day long on the complex inter-relationship of natural resource development and resource conservation.

I think the value of this type of program will continue to increase in the future, especially in an area like Montana, where we are richly blessed with natural resources in a beautiful environmental setting.

I am looking forward to additional involvement in environmental educational opportunities with Mr. Cannon and Mr. Maxson.

Sincerely yours,

Charles R. Frey

CHARLES R. FREY
Staff Geologist
Lewis & Clark National Forest

City of GREAT FALLS Montana 59403-5021

P. O. BOX 5021 TELEPHONE 406 / 727-5881

May 23, 1986

Mrs. Jan Thomson
Great Falls School Administration
P.O. Box 2428
Great Falls, MT 59403

Dear Mrs. Thomson:

I have always felt the Great Falls School District's Environmental Program was superb and second to none. The program has been well designed and implemented which gives the students the proper and additional education that most young people would not receive from the home.

The School District's program has been well guided and gifted with excellent instructors to provide the elementary students a necessary concern for their own environment plus a respect for each other, citizenship, and the development of good quality young people for the future.

Keep up the good work for our children of tomorrow.

Sincerely,

Sgt. Ken Grady

Sgt. Ken Grady
Crime Prevention
Great Falls Police Department

Buying and selling
the basics.
Pacific
Steel/Hides/Furs/Recycling
1401 3rd Street N.W.
P.O. Box 1549
Great Falls, Montana 59403
(406) 727-6222

May 23, 1986

Jan Thomsom
Great Falls School District
P. O. Box 2428
Great Falls, Mt. 59403

Dear Jan:

Dennis Maxon called today concerning the Enviromental Education Program.

We at Pacific are very pleased that this program is in effect. We feel the tours thru our facility gives the students and teachers a "first hand" look at recycling.

We recycle all metals of economic value as well as newspaper. We also buy hides and furs which end up as leather and/or garments.

Dennis does a "great" job of explaining to the students the advantages of recycling. Dennis in my mind should be commended for a job well done.

We look forward to future tours.

Sincerely,

PACIFIC HIDE & FUR DEPOT

LeRoy Stevens
Executive Vice President

LS/jj

MONTANA POWER COMPANY mpc
101 CENTRAL AVENUE, GREAT FALLS, MONTANA 59401 • TELEPHONE (406) 727-1231

GEORGE A. THORSON
DIVISION MANAGER

MAY 29, 1986

MRS. JAN THOMPSON,

THE ENVIRONMENTAL SCIENCE DEPARTMENT OF THE GREAT FALLS PUBLIC SCHOOLS EACH YEAR CONDUCTS TOURS OF OUR BLACK EAGLE HYDRO ELECTRIC GENERATION COMPLEX.

DURING A TWO WEEK PERIOD EACH YEAR, AN AVERAGE OF 750 STUDENTS MAKE THIS TOUR.

JOHN CANNON AND DENNIS MAXSON DO AN OUTSTANDING JOB INFORMING THE STUDENTS ON THESE TOURS. I AM SURE THE STUDENTS ARE MORE KNOWLEDGEABLE OF POWER PRODUCTION AND ENERGY CONSERVATION AFTER THESE TOURS.

SINCERELY,

George Bernius

GEORGE BERNIUS
OPERATION SUPERVISOR

United States Department of Agriculture | Forest Service | Lewis & Clark NF | P.O. Box 871 Great Falls, MT 59403

Reply to: 1620

Date: May 29, 1986

Janet Thomson
Curriculum Coordinator
Great Falls Public Schools
P.O. Box 2428
Great Falls, Montana 59403

Dear Jan,

Congratulations on another successful year coordinating the environmental education curriculum for the Great Falls school system. The Lewis and Clark National Forest is fortunate to have such an extensive program in close proximity to the National Forest lands. Your students and their parents are the primary visitors to the Forest. I have no doubt that the environmental education program has helped instill an appropriate land use ethic in our young people.

We are happy to continue to contribute to the program in the upcoming years. The Kings Hill Ranger District will be available to provide assistance and information on Forest management, as in the past. Again, thank you for providing the students of Great Falls with an increased awareness of their environment. If we can be of any further assistance, please feel free to contact Jane Weber, Forest Public Information Officer.

JOHN D. GORMAN
Forest Supervisor

FS-6200-28(7-82)

Sun River Elementary School - DISTRICT NO. 97

Phone 264-5330 Sun River, Montana 59483

February 22, 1985

Mr, Dennis Maxson
Great Falls Administration Bldg.
Environmental Education Dept.
P.O. Box 2428
Great Falls, Montana 59403

Dear Mr, Maxson,

Thank-you for the valuable material you gave our school at the Ag in Montana Schools meeting February 20.

It has been explained and passed out to the appropriate grade level.

Sincerely yours,

Nellie Sherman
Superintendent
Nellie Sherman

Bev, Townsend
grade 4, teacher
Bd. Townsend

BT/ft

Cascade County
State of Montana
TELEPHONE (406) 761-6700
Great Falls, Montana 59401

March 18, 1986

Janet Thomson
Curriculum Supervisor
School Dist. #1 & A
P.O. Box 2428
Great Falls, MT 59403

Dear Janet:

I wish to express my appreciation for the presentation by Dennis Maxson and John Cannon on Environmental Science. They not only made the workshop very interesting but presented the teachers with many useful materials.

You certainly can be proud of these two very capable and professional men.

Sincerely,
Helen Loney
Helen Loney
Cascade Co. Supt. of Schools

CENTER OF MONTANA'S LIVESTOCK AND FARMING AREAS